WHAT IS CLAIMED IS:

1. A method of fabricating a semiconductor device, comprising steps of:

connecting a laser oscillator oscillating a near infrared laser beam and an irradiation optical system with each other through an optical fiber member having a single core part; and

heating a semiconductor layer by irradiating said near infrared laser beam from said irradiation optical system.

2. The method of fabricating a semiconductor device according to claim 1, wherein

said step of heating said semiconductor layer includes a step of crystallizing said semiconductor layer by heating said semiconductor layer with said near infrared laser beam.

3. The method of fabricating a semiconductor device according to claim 1, wherein

said step of heating said semiconductor layer includes a step of activating an impurity introduced into said semiconductor layer by heating said semiconductor layer with said near infrared laser beam.

4. The method of fabricating a semiconductor device according to claim 1, wherein

said step of connecting said laser oscillator and said irradiation optical system with each other through said optical fiber member includes a step of connecting said laser oscillator and said irradiation optical system with each other through said optical fiber member having a length capable of reducing dispersion in intensity of said laser beam resulting from oscillation of a higher mode.

5. The method of fabricating a semiconductor device according to claim 4, wherein

said step of connecting said laser oscillator and said irradiation optical system with each other through said optical fiber member includes a step of connecting said laser oscillator and said irradiation optical system with each other through said optical fiber member having a length of at least about 10 m.

6. The method of fabricating a semiconductor device according to claim 1, wherein

said laser oscillator includes a first laser oscillator and a second laser oscillator,

said optical fiber member includes a first optical

fiber member having a single core part connected to said first laser oscillator and a second optical fiber member having a single core part connected to said second laser oscillator, and

said irradiation optical system includes a single irradiation optical system connected with said first optical fiber member and said second optical fiber member for irradiating a single laser beam.

7. The method of fabricating a semiconductor device according to claim 6, wherein

said irradiation optical system includes a first cylindrical lens receiving light from said first optical fiber member, a second cylindrical lens receiving light from said second optical fiber member, a single kaleidoscopic lens receiving said light from said first cylindrical lens and said light from said second cylindrical lens and a third cylindrical lens receiving light from said single kaleidoscopic lens while irradiating a single laser beam.

8. The method of fabricating a semiconductor device according to claim 6, wherein

an outlet of said first optical fiber member and an outlet of said second optical fiber member are arranged

along the longitudinal direction of a linear laser beam at a prescribed interval.

9. The method of fabricating a semiconductor device according to claim 1, wherein

said step of connecting said laser oscillator and said irradiation optical system with each other through said optical fiber member includes a step of installing said laser oscillator in a first room while installing said irradiation optical system in a second room and connecting said laser oscillator and said irradiation optical system with each other through said optical fiber member having said single core part.

10. The method of fabricating a semiconductor device according to claim 1, wherein

said step of heating said semiconductor layer includes steps of:

forming an absorption film either above or under said semiconductor layer, and

irradiating said absorption film with continuous-wave said near infrared laser beam thereby making said absorption film generate heat and crystallizing said semiconductor layer through said heat.

11. The method of fabricating a semiconductor device according to claim 10, wherein

said absorption film consists of a material containing a high melting point metal.

12. The method of fabricating a semiconductor device according to claim 1, wherein

said optical fiber member includes a step index optical fiber member.

13. The method of fabricating a semiconductor device according to claim 1, wherein

said irradiation optical system includes either an array lens optical system or a kaleidoscopic optical system.

14. The method of fabricating a semiconductor device according to claim 1, wherein

said near infrared laser beam is either a linear laser beam or a rectangular laser beam.

15. The method of fabricating a semiconductor device according to claim 1, wherein

said core part of said optical fiber member has a diameter of not more than about 0.6 mm.

16. The method of fabricating a semiconductor device according to claim 1, wherein

said near infrared laser beam is a continuous-wave YAG laser beam.

17. The method of fabricating a semiconductor device according to claim 1, wherein

said step of heating said semiconductor layer by irradiating said near infrared laser beam from said irradiation optical system includes a step of feedback-controlling the output of said near infrared laser beam in said laser oscillator.

18. The method of fabricating a semiconductor device according to claim 1, wherein

said laser oscillator includes a single laser oscillator,

said optical fiber member includes a first optical fiber member and a second optical fiber member having single core parts connected to said single laser oscillator, and

said irradiation optical system includes a single irradiation optical system connected with said first optical fiber member and said second optical fiber member

for irradiating a single laser beam.

19. The method of fabricating a semiconductor device according to claim 18, wherein

said laser oscillator includes a first mirror transmitting about half of said oscillated laser beam while reflecting about the remaining half of said oscillated laser beam and a second mirror reflecting said laser beam reflected by said first mirror,

said laser beam transmitted through said first mirror is incident upon said first optical fiber member, and

said laser beam reflected by said second mirror is incident upon said second optical fiber member.

20. The method of fabricating a semiconductor device according to claim 1, wherein

said optical fiber member includes a first optical fiber member and a second optical fiber member having single core parts connected to said laser oscillator,

said laser oscillator includes a single laser oscillator for a dual head structure temporally switching said first optical fiber member and said second optical fiber member,

said irradiation optical system includes a first irradiation optical system connected with said first

optical fiber member and a second irradiation optical system connected with said second optical fiber member, and

said step of heating said semiconductor layer by irradiating said near infrared laser beam from said irradiation optical system includes a step of irradiating different semiconductor layers with said near infrared laser beams through said first irradiation optical system and said second irradiation optical system.

21. A system of fabricating a semiconductor device, comprising:

a machinery room storing a laser oscillator oscillating a near infrared laser beam;

at least either a clean room or a service area storing an irradiation optical system for heating a semiconductor layer by irradiating said near infrared laser beam from said irradiation optical system; and

an optical fiber member having a single core part connecting said laser oscillator and said irradiation optical system with each other.

22. The system of fabricating a semiconductor device according to claim 21, wherein

said machinery room and either said clean room or

said service area are set on different locations in a factory for fabricating said semiconductor device.